

Arctic Stewardship: Maintaining Regional Resilience in an Era of Global Change

Oran R. Young

That the Arctic is undergoing transformative changes driven in large part by external forces is no longer news.¹ The high latitudes of the Northern Hemisphere, which are not themselves significant sources of anthropogenic emissions of greenhouse gases (GHGs) or short-lived climate pollutants (such as black carbon soot), are experiencing effects attributable to climate change that are equal to or greater than those occurring in any of the planet's other large regions.² Prominent among these effects are rising surface temperatures, a deepening of the active layer of the permafrost, the collapse of sea ice, increases in the intensity of coastal storm surges made possible by the retreat of sea ice, the accelerated melting of the Greenland ice sheet, and the acidification of marine systems. The deposition of black carbon in the high north alone—almost 60 percent of which is thought to originate in Europe³—appears to account for half or more of the increase in temperature occurring in the Arctic.⁴ Positive feedback processes, such as lowered albedo (that is, the capacity of Earth's surface to reflect incoming solar radiation back into space) following the melting of ice at sea and snow on land, have the effect of magnifying the impact of these external forces. Nowhere is the challenge of adapting to the impacts of climate change more urgent than in Arctic coastal communities confronted with the need to relocate to avoid physical destruction.⁵ And nowhere are the threats to individual species (for example, the polar bear) and whole ecosystems more severe than they are in the Arctic, where biophysical changes are outstripping the capacity of plants and animals to adapt to altered conditions.⁶

At the same time, increased access to the Arctic resulting from climate change has made the region more attractive to global economic players concerned with commercial shipping and the production of the raw materials (minerals,

hydrocarbons, and others) essential to the operation of the advanced industrial economies of the midlatitudes. Given the forecast that the volume of international trade is likely to triple by 2020, with 90 percent of it traveling by sea, the intensity of international interest in commercial shipping in the Arctic is hardly surprising.⁷ Projections show that the Arctic may contain 13 percent of the world's undiscovered oil and 30 percent of its undiscovered natural gas, along with large proven deposits of nickel, lead, zinc, iron ore, and diamonds—making it easy to grasp the region's attraction to powerful multinational corporations.⁸ The actions of these global players can produce local benefits, including employment opportunities for Arctic residents and tax revenues for local and regional governments. But it is clear that the welfare of northern peoples and Arctic ecosystems is not the primary concern of corporate decision-makers. They may easily redirect their attention to other regions of the world as opportunities and constraints shift, regardless of the consequences of their actions for northern communities.

This essay explores the consequences of these developments for the Arctic and seeks to identify strategies for enhancing its resilience, given the extent to which external forces determine the course of events in the region. Specifically, I address the following questions: What sorts of harms arising from changes now occurring in the Arctic are actionable in the sense that it is realistic to expect existing legal and political processes to respond to them in specific cases? Who can and should take the actions required to respond to these harms? What specific remedies are available to those harmed by the impact of external forces? How can we encourage responsible outsiders to fulfill their commitments? Equally important, how can we avoid actions taken in this context that (however well-intentioned) give rise to the pathologies of paternalism, internal colonialism, or neocolonialism? Are there innovations in governance arrangements that will help to produce positive responses to these concerns? I discuss these questions in ethical terms, but at the same time frame them in such a way as to generate practical suggestions regarding ways to move forward. My goal is to contribute to the development of a coherent discourse, one that can help us to frame the debate about how to respond to the effects of external forces on Arctic socio-ecological systems and to identify promising options, rather than to arrive at specific policy recommendations that are politically actionable under the current conditions. In the process, I hope to contribute to the development of a way of thinking about these issues that deserves the label of Arctic stewardship.⁹

ACTIONABLE HARMS

Not all externally driven changes in the Arctic produce negative effects on social welfare or ecological integrity. Some current or prospective changes evoke mixed reactions in the sense that some expect to benefit from them even as others emerge as victims. Equally important, not all harmful developments are actionable in the sense that prevailing legal and political practices will allow us to identify specific parties who can and should be expected to take steps to avoid these developments in the first place or to provide remedies after the fact. How, then, in our effort to develop a discourse of Arctic stewardship, can we identify those harms that are actionable under current and likely future conditions?¹⁰

Extractive industries in the Arctic can produce—directly or indirectly—jobs for individuals, investment opportunities for businesses, and revenues for local and regional governments. In Alaska, for instance, the North Slope Borough has profited greatly from property taxes levied on the infrastructure at Prudhoe Bay created to exploit oil reserves, such that the Alaska state government has been able to avoid instituting statewide income or sales taxes. The state has even used some of these revenues to create a sovereign wealth fund, known as the Permanent Fund, which pays a sizable annual dividend to every Alaskan resident. The development of energy resources is injecting significant quantities of cash into the northernmost counties of Norway and turning the city of Tromsø into what many have come to think of as the capital of the Arctic. Some Greenlanders see oil and gas development in the island's coastal waters as a ticket to financial independence, which would also allow for a final political and legal separation of Greenland from Denmark.

Of course, gains for some can give rise to losses for others. The development of the giant Bovanenkovo gas field on the Yamal Peninsula in northwestern Siberia, for example, is helpful to producers and consumers of natural gas but harmful to the livelihoods of Nenets reindeer herders, whose annual migration routes are likely to be disturbed. Those who hunt caribou in Alaska and the Canadian North would prefer to see hydrocarbon development move offshore, while those who hunt sea mammals find onshore development preferable. These preferences often correlate with ethnic differences. For example, in the Arctic National Wildlife Refuge in northeastern Alaska, Athabascan hunters of caribou oppose the opening of the coastal plain to potential oil development, whereas Inuit hunters of sea mammals prefer opening the coastal plain to allowing such development in the

coastal waters of the Beaufort Sea. Similar dilemmas exist in the case of commercial shipping, which some see as a welcome source of economic opportunities for coastal communities but others regard as a potential source of uncontrollable pollution.

There is an important distinction between harms that are widely regarded as actionable through existing legal and political processes and harms that are generally treated as unfortunate occurrences but fundamentally matters of bad luck, whose victims cannot expect to receive support or succor. Disasters or extreme events—whether natural, man-made, or some combination of the two—typically evoke societal responses in the form of emergency relief, aid to victims, and financial assistance for reconstruction. Such cases as the Asian tsunami of 2004, Hurricane Katrina in 2005, the 2010 earthquake in Haiti, and the Japanese tsunami of 2011 come to mind. On the other hand, societal responses are rare in cases where communities are devastated by the exhaustion of the natural resources (for example, minerals and fish) that are essential to their existence, where keystone industries depart for greener economic pastures, where new industries marginalize old ones, or where the development of large-scale infrastructure (for example, the interstate highway system in the United States) bypasses communities, leaving them to wither economically. Many have commented on the plight of the U.S. rust belt, for example, but there is a notable lack of large-scale programs designed to offset the social and ecological harms associated with this development.

Even when such programs are available, however, the results vary. Both the United States and the European Union operate large-scale programs featuring subsidies and price supports designed to sustain agricultural and fishing operations that would otherwise go out of business. In some countries such programs contribute to overcapitalization in commercial fisheries, which has stymied reforms needed to enhance the sustainability of fish stocks and associated ecosystems. In other countries, governments sell publicly owned timber at below market value, in part to avoid the economic and social disruption that would otherwise hit communities dependent on these resources.

What are the implications of these observations for stewardship in the Arctic? Are storm surges that threaten to wash away coastal villages, melting permafrost that undermines infrastructure, or the impact of oil spills on marine or terrestrial ecosystems actionable in the sense I have used the term? Three circumstances are likely to make such harms legally or politically actionable. First, where those harmed

can be portrayed in a convincing manner as victims of extreme events or natural disasters (such as coastal communities suffering from the consequences of storm surges), the case for public relief will be strong. Second, where those harmed have recognized rights (such as the right of indigenous peoples to the subsistence harvest of whales), claims may fare well in legal as well as political settings. Third, where national interests are at stake (such as the Norwegian interest in maintaining a viable human population on Svalbard, or the Canadian interest in maintaining a human presence in the high Arctic to buttress Canadian claims to sovereignty), the case for public support will rest on political considerations that may carry the day. These circumstances are not mutually exclusive. Victims of disasters may be rights holders as well. Actions designed to accommodate the concerns of rights holders may also serve the national interest.

Generally speaking, it is easier to make a case that harms to species or ecosystems are actionable when they have obvious consequences for human welfare. It is one thing to say that we should protect bowhead whales or caribou because they are essential to the welfare of indigenous peoples who are entitled to maintain long-standing and highly valued ways of life; it is another to argue that harms to bowhead whales and caribou are actionable because these animals have rights of their own or because we have an obligation to maintain Arctic ecosystems in their natural state. The latter argument suggests that we should adopt a biocentric ethic of the sort envisioned in Aldo Leopold's concept of a land ethic, in contrast to an anthropocentric ethic.¹¹ There is much to be said for adopting this idea, at least in aspirational terms, as we seek to flesh out the discourse of Arctic stewardship. But in the short run, we are in need of persuasive anthropocentric arguments that can provide the rationale for protecting the socio-ecological systems of the Arctic.

RESPONDENTS

Once we identify a class of actionable harms, the next challenge is to determine who is or should be expected to prevent such harms from occurring or to take suitable steps to remedy them after the fact. In thinking about Arctic stewardship, several initial distinctions provide a point of departure. There is, to begin with, a distinction between public actors and private actors. Whereas private actors are likely to be held responsible only when there is a demonstrable relationship between their actions and the relevant harm, public actors may take actions based on a more general sense of responsibility for the welfare of victims. There

is also the question of establishing the locus of responsibility to take responsive actions across levels of social organization. Are national governments the place to look for arrangements designed to address harms resulting from changes occurring in the Arctic? Could international mechanisms be devised to deal with matters of Arctic stewardship? Or should victims focus on local or regional governments in their search for protection?

Some actors seem ready and willing to address harms at the level of declaratory policy. The most recent statement from the European Commission regarding the Arctic, for example, asserts that the EU needs to “step up its engagement with its Arctic partners to jointly meet the challenge of safeguarding the environment while ensuring the sustainable development of the Arctic region.”¹² This sounds promising in general terms, but what does it mean in practice? Will the EU establish operational procedures to apply this general commitment to concrete situations? How might the EU collaborate with its “Arctic partners” for this purpose? Will it consider compensating those whose welfare is harmed by European actions—for example, by its ban on the importation of seal products?¹³ What, for instance, would this declaratory policy mean in addressing the consequences of black carbon deposition in the Arctic? None of these comments is meant to single out the European Union as an unusual case in these terms. Exactly the same concerns apply to others and especially to those public and private actors whose actions are implicated in the economic and environmental forces currently driving transformative change in the Arctic.

In more operational terms, it is possible to address the issue of identifying respondents to actionable harms either through legal proceedings or through political/administrative channels. In Western democracies, at least, turning to the courts is a common practice in such situations; the law of torts has evolved precisely to cover situations in which, in the absence of any allegations of criminal negligence, the actions of one or several actors inflict harm on others. But even in systems in which tort law is well developed there are problems with the use of this strategy.¹⁴ What courts would have jurisdiction in cases of this sort? A village in Arctic Alaska facing destruction by intensifying storm surges might turn to the federal district court for Alaska. But what should the Nenets in northwestern Siberia who are affected by the development of the Bovanenkovo gas field and its related infrastructure do? Is there recourse for those whose livelihoods are disrupted by marine oil spills, the effects of which transcend national boundaries? Beyond this lies the question of standing. Who would or should have the legal

right to file suit in cases involving actionable harms occurring in the Arctic, especially in cases where the injuries are largely to ecosystems, in contrast to social systems?

Even more challenging are questions pertaining to evidence. The harms arising from climate change and economic globalization are products of the actions of many actors whose individual responsibility is often difficult to pin down. It takes little imagination under the circumstances to envision situations in which an array of experts would offer conflicting evidence regarding the extent to which the actions of specific actors (oil companies, shipping companies, government agencies, and others) are to blame for the harms.

None of this is to suggest that legal procedures are unworkable. If Shell's operations in the Chukchi Sea or the Beaufort Sea were to cause a spill that was demonstrably harmful to the bowhead whales that frequent the area, for example, there is little doubt that one of the villages in the area or the North Slope Borough would file a suit for damages against the company—and perhaps the U.S. Department of the Interior—in federal district court. Given the fiduciary responsibility of the federal government with regard to Native Americans, such a suit might well succeed.¹⁵ Still, it seems clear that it would be unreasonable to expect legal proceedings to carry the full burden of dealing with the challenge of responding to actionable harms in the development of a doctrine of Arctic stewardship. This makes it all the more important to explore the potential for political channels to help in meeting this challenge. Two distinct (but not mutually exclusive) options deserve consideration in this context: domestic political channels and international or transnational political channels.

Some Arctic states have domestic procedures that are capable of taking on issues of this sort. Perhaps the most prominent example in the Arctic is the role of royal commissions in Canada as exemplified by the Mackenzie Valley Pipeline Inquiry of the 1970s and the Commission on Aboriginal Peoples of the 1990s.¹⁶ But other methods, such as the practice of U.S. congressional committees of holding field hearings to draw attention to specific issues, are also worthy of consideration. Finding ways to address transboundary harms presents a particularly interesting challenge. The Arctic Council—the leading intergovernmental body addressing issues of common concern in the Arctic—may become an important actor in this realm. If a legally binding Polar Code dealing with commercial shipping in the Arctic enters into force, the International Maritime Organization may become active in devising effective responses to certain actionable harms,

such as the effects on coastal communities of accidents involving oil tankers or liquefied natural gas tankers using the Northern Sea Route.

Politically, it seems reasonable to propose that non-Arctic countries or intergovernmental organizations, such as the European Union, seeking a voice in the treatment of Arctic issues should participate in the establishment and operation of a system for responding to actionable harms in the region. But it must be clear that this is a two-way street. Not only would this strategy require the Arctic states to listen seriously to the voices of non-Arctic actors regarding Arctic issues; it would also require the Arctic states themselves to devise ways to accept their own responsibility for various actionable harms. This would be a big step; it is not easy to envision a practical procedure through which such a step could be taken in a credible manner. But given the fact that the Arctic is becoming more tightly linked to global processes, it is possible that developments along these lines will become politically feasible sooner rather than later.

REMEDIES

Identifying respondents is a necessary but not a sufficient condition for addressing actionable harms. Once private or public actors accept responsibility or agree to serve as respondents, the question of remedies comes into focus. How should we think about remedies in cases where those injured care more about preserving a way of life than about being compensated for their losses, or where those injured (for example, environmentalists) care more about values that are difficult or impossible to represent in monetary terms, such as the protection of species or ecosystems? The idea of stewardship may suggest innovative approaches to remedies that cannot be calculated in terms of monetary value alone.

Courts often approach remedies through the practice of assessing damages and the principle of making victims whole. But this is not the only strategy available to courts confronted with the problem of addressing actionable harms. Courts can also provide injunctive relief or interpret the relevant laws in such a way as to impose conditions on the actions of key players in order to minimize the likelihood that these harms will occur or become serious. Consider the case of Shell's offshore drilling in the Beaufort and Chukchi seas.¹⁷ Let us say that environmental groups opposing Shell's operations there seek injunctive relief in the form of an order that Shell refrain from drilling until it is able to provide convincing evidence that it has adequate capacity to deal with oil spill prevention,

preparedness, and response. Whether or not a federal court grants injunctive relief to these environmental groups, it may still impose (potentially costly) conditions on Shell's operations in this realm. In the United States, at least, environmental groups have succeeded on some occasions in using such tactics to delay potentially harmful activities or to drive up their costs. In some cases, key actors have abandoned these activities altogether, either due to the costs imposed or out of sheer frustration with the complications of doing such business.

Useful as these remedies may be in some situations, they hardly seem adequate to address the range of actionable harms under consideration here. Several more political alternatives seem promising, notably: (1) the recognition of the rights of the Arctic's indigenous peoples; (2) the creation of policy forums in which matters of Arctic stewardship can be identified and brought to the attention of relevant publics; and (3) the launching of projects, such as the preparation of assessment reports, that provide opportunities to develop the discourse of Arctic stewardship as applied to concrete situations.

Rights are important because participants in policy processes often treat them as trumping arguments based on utilitarian calculations of costs and benefits.¹⁸ Such considerations take on particular force when the numbers of those harmed are small and when the relevant harms in question center on the status of ecosystems rather than on social welfare. Particularly interesting in this regard are developments occurring within individual Arctic states (such as the aboriginal/native claims settlements in Canada and the United States), initiatives involving two or more Arctic states (for example, the proposed Saami Convention in Fennoscandia), and broader international actions that apply to the Arctic (most prominently the adoption of the 2007 UN Declaration on the Rights of Indigenous Peoples).¹⁹ All these developments have strengthened the hand of Arctic peoples when it comes to addressing actionable harms, especially in political settings. Both private and public actors may still behave in ways that prove harmful to the welfare of Arctic communities. But they know that they cannot act with impunity regarding such matters, and there are cases in which the articulation of rights actually imposes significant pressure on them either to refrain from actions that are attractive in utilitarian terms or to take notice of the claims of those harmed by specific actions, such as by the construction of the Alta Dam in Norway.

For all its limitations, the Arctic Council has played an important role in identifying, framing, and drawing public attention to actual or potential harms in the

Arctic. The work of the council's working group known as the Arctic Monitoring and Assessment Programme (AMAP), for instance, has provided documentation regarding the impacts of various pollutants on both human welfare and ecosystem health in the region. It has demonstrated convincingly that these pollutants, which originate outside the Arctic, make their way to the far north via mechanisms involving airborne and waterborne transit.²⁰ The *Arctic Climate Impact Assessment*, a report commissioned by the council, provided convincing documentation for the first time that climate change is occurring in the high latitudes of the Northern Hemisphere at a faster rate than anywhere else on the planet and that its consequences are already severe.²¹ Activities of this sort are not sufficient to ensure that specific respondents will take effective steps to avoid or mitigate actionable harms in the Arctic. But there is little doubt that the publicity arising from these reports makes a difference. To take just one example, the evidence clearly suggests that AMAP's reports on Arctic contaminants helped to energize the negotiations that produced the 2001 Stockholm Convention on Persistent Organic Pollutants.²²

Beyond this lie activities motivated in part by the goal of developing a paradigm of Arctic stewardship rather than just documenting specific harms. One concrete example is reflected in the 2004 *Arctic Human Development Report* (AHDR), another initiative carried out under the auspices of the Arctic Council.²³ Taking the UN Human Development Index (UNHDI) as a point of departure,²⁴ the AHDR argued that, when evaluating the quality of life in the Arctic, it is essential to supplement the UNHDI with considerations relating to the ability to control one's own destiny, opportunities to have meaningful contact with nature, and the maintenance of human relationships that produce social cohesion. It would be a mistake to exaggerate the influence of the AHDR. But it is equally important not to dismiss the role of such efforts in developing a discourse and framing issues on the policy agenda, even when they do not lead directly to easily identifiable shifts in policy.

IMPLEMENTATION

Whatever form remedies take in specific cases, they are seldom self-executing. Thus, there is a need to create mechanisms capable of translating remedies from paper to practice and administering them over time to ensure that they are effective. This is where concerns about paternalism and neocolonialism

come into focus. It is not enough for outsiders to agree to respond to actionable harms and to deal with them in material terms where highly valued ways of life and social practices are at stake. What is needed is an effort to devise ways to ensure that the remedies work and that Arctic residents and other interested parties are satisfied with the results. Mechanisms that have arisen to meet this challenge include the creation of comanagement arrangements, the establishment of local and regional governments in the Arctic, and the inclusion of Arctic experts in processes leading to the negotiation of relevant multilateral environmental agreements.

Comanagement arrangements provide opportunities for local users to have an effective voice in management decisions relating to specific resources, even while governments (most often national governments) retain formal authority regarding such decisions. Such arrangements help incorporate traditional ecological knowledge into decision-making processes, take into account the concerns of actual users of these resources, and enhance feelings of ownership and legitimacy on the part of members of user communities. Comanagement arrangements have become popular in the Arctic—especially in the North American Arctic—and they are now chalking up a track record that is sufficient to assess their performance. There is currently a variety of comanagement arrangements in place involving human uses of renewable resources, including terrestrial animals, such as caribou; marine mammals, such as belugas and narwhals; and migratory birds, such as brant geese.²⁵ It is clear that comanagement arrangements do not constitute a panacea. Broadly speaking, however, this institutional innovation shows considerable promise as a means to provide local communities with opportunities to participate meaningfully in management decisions and, thus, to enhance the legitimacy of the results.

Endowing local or regional governments with the authority to pursue sustainable development constitutes another promising approach to implementation. It is important to note that this will not automatically result in decisions that are antithetical to the plans of multinational corporations desiring to exploit Arctic resources. The North Slope Borough is not resolutely opposed to all offshore oil development in the Beaufort Sea and Chukchi Sea. The government of the Northwest Territories in Canada has a considerable stake in the benefits arising from the development of diamond mining within its jurisdiction over the last several decades. The Greenland home rule, which now has full control over decisions regarding natural resources within its jurisdiction, is not averse to exploratory

drilling in search of recoverable reserves of oil.²⁶ Nevertheless, the emergence of these local bodies does give Arctic residents a voice in making decisions about what happens in their region. Those concerned with the protection of endangered species or interested in ecosystem-based management may be disappointed in some of the actions of local and regional governments. Nonetheless, these governments can and do play a role in providing the Arctic's residents with a sense that they have some control over their own destiny.

For the most part, I have been directing attention to the challenge of protecting the Arctic from the effects of external forces, such as climate change and economic globalization. But there is also an opportunity for Arctic actors to play a role as a driver of global processes. As noted above, evidence regarding the impacts of contaminants in the Arctic played a role in the thinking of those who negotiated the terms of the 2001 Stockholm Convention on Persistent Organic Pollutants.²⁷ A similar process is currently under way in the negotiations aimed at producing a global and legally binding instrument dealing with the environmental impacts of mercury.²⁸ Increasingly, the voice of the Arctic is being heard, and it is making a difference in global efforts to devise governance systems for problems affecting social welfare and ecosystems worldwide.

CONCLUSION

Climate change, globalization, and the actions of multinational corporations are major determinants of both social welfare and the status of ecosystems in the Arctic. But this does not mean that the region is fated to be a helpless victim of these forces. There is much to be said for developing a discourse of Arctic stewardship in response to this situation, a way of thinking that emphasizes the identification of actionable harms and appropriate respondents, the development of realistic remedies, and the establishment of mechanisms designed to administer these remedies in a manner that Arctic residents regard as legitimate. Among the measures that seem particularly timely are the development of improved systems for monitoring, reporting, and verification needed to provide documentation regarding actionable harms, and enhanced procedures for prevention, preparedness, and response to minimize the dangers of such undesirable occurrences as oil spills. Succinctly, what we need are safeguards capable of minimizing the threats to socio-ecological systems in the Arctic, providing early warning when things do start to go wrong, and establishing rapid response capabilities to address

the resultant harms. It is in this middle ground between unregulated development on the one hand and the more restrictive precepts of biocentric preservationism on the other that the discourse of Arctic stewardship can flourish.

NOTES

- ¹ *Ambio*, Special Issue: “The Arctic in the Earth System Perspective—The Role of Tipping Points,” *Ambio* 41, no. 1 (2012); and James Astil, “The Melting North,” *Economist*, Special Report: The Arctic, June 16, 2012.
- ² Arctic Monitoring and Assessment Programme, *Snow, Water, Ice, and Permafrost in the Arctic Region* (Oslo: AMAP, 2011).
- ³ Sandra Cavalieri et al., *EU Arctic Footprint and Policy Assessment* (Berlin: Ecologic Institute, 2010).
- ⁴ UNEP/WMO, “Integrated Assessment of Black Carbon and Tropospheric Ozone”; www.unep.org/dewa/Portal/67/pdf/BlackCarbon/_SDM.pdf; and “Climate Change in the Arctic: Beating a Retreat,” *Economist*, September 24, 2011.
- ⁵ Government Accountability Office, *Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion*, GAO-09-551 (Washington, D.C.: GAO, 2009).
- ⁶ Larry Greenemeier, “U.S. Protects Polar Bears under Endangered Species Act,” *Scientific American*, May 14, 2008; www.scientificamerican.com/article.cfm?id=polar-bears-threatened.
- ⁷ UNEP/IOC-UNESCO, An Assessment of Assessments, “Why a Global Marine Assessment”; www.unep-regular-process.org/index.php?option=com_content&task=view&id=1&Itemid=2.
- ⁸ D. L. Gautier et al., “Assessment of Undiscovered Oil and Gas in the Arctic,” *Science* 324 (2009), pp. 1175–79.
- ⁹ For an account of the idea of stewardship from the perspective of the natural sciences, see F. Stuart Chapin III et al., “Earth Stewardship: A Strategy for Social-ecological Transformation to Reverse Planetary Degradation,” *Journal of Environmental Studies and Science* 1 (2011), pp. 44–53. A social science perspective can be found in Franklyn Griffiths, “Stewardship as Concept and Practice in an Arctic Context,” *CyberDialogue*, University of Toronto, 2012.
- ¹⁰ Note that what constitutes an actionable harm in one legal or political setting may not be actionable in another.
- ¹¹ Aldo Leopold, *A Sand County Almanac, With Essays on Conservation from Round River* (New York: Ballantine Books, 1970).
- ¹² European Commission, “Developing a European Union Policy Towards the Arctic Region: Progress Since 2008 and Next Steps,” Joint Communication to the European Parliament, Brussels, June 26, 2012.
- ¹³ European Commission, “Trade in Seal Products” (2012); http://ec.europa.eu/environment/biodiversity/animal_welfare/seals/seal_hunting.htm.
- ¹⁴ For a powerful account documenting how hard it is to assign responsibility for environmental harms, see Jonathan Harr, *A Civil Action* (New York: Vintage Books, 1970).
- ¹⁵ Nell Jessup Newton et al., *Cohen’s Handbook of Federal Indian Law* (2005).
- ¹⁶ Thomas R. Berger, *Northern Frontier, Northern Homeland: The Report of the Mackenzie Valley Pipeline Inquiry* (Toronto: James Lorimer, 1977); and Royal Commission on Aboriginal Peoples, *Report of the Royal Commission on Aboriginal Peoples* (Ottawa: Department of Indian Affairs and Northern Development, 1996).
- ¹⁷ John M. Broder and Clifford Krauss, “New and Frozen Frontier Awaits Offshore Oil Drilling,” *New York Times*, May 23, 2012.
- ¹⁸ Ronald Dworkin, *Taking Rights Seriously* (Cambridge, Mass.: Harvard University Press, 1978).
- ¹⁹ UN General Assembly, “United Nations Declaration on the Rights of Indigenous Peoples,” A/RES/61/295, 2007.
- ²⁰ Arctic Monitoring and Assessment Programme, *State of the Arctic Environment Report* (Oslo: AMAP, 1997, 2002).
- ²¹ “Arctic Climate Impact Assessment, Arctic Climate Impact Assessment: Report to the Arctic Council (Cambridge: Cambridge University Press, 2005); www.acia.uaf.edu/pages/scientific.html.
- ²² David L. Downie and Terry Fenge, eds., *Northern Lights against POPs: Toxic Threats in the Arctic* (Montreal: McGill-Queen’s University Press, 2003).
- ²³ *Arctic Human Development Report*, a report to the Arctic Council (Akureyri, Isl.: Stefansson Arctic Institute, 2004).

- ²⁴ The UNHDI, developed by the UN Development Programme during the 1990s, adds measures of longevity and education to GDP per capita in an effort to provide a fuller account of human welfare. See hdr.undp.org/en/statistics.
- ²⁵ Derek Armitage, Fikret Berkes, and Nancy Doubleday, eds., *Adaptive Co-Management: Collaboration, Learning, and Multi-Level Governance* (Vancouver: University of British Columbia Press, 2008).
- ²⁶ Danish Prime Minister's Office, "The Greenland Self-Government Arrangement"; www.stm.dk/_p_13090.html.
- ²⁷ Downie and Fenge, eds., *Northern Lights against POPs*.
- ²⁸ Arctic Monitoring and Assessment Programme, *Mercury in the Arctic* (Oslo: AMAP, 2011).